

CLAIMS

1. A hydraulic control arrangement for a variator of the type having a pair of races, at least one roller which is arranged to engage both races to transfer drive from one race to the other and is movable in accordance with changes in variator drive ratio, a hydraulic traction loading actuator arranged to apply a traction load urging the roller and races into engagement to provide traction therebetween and so enable the transfer of drive, and at least one hydraulic roller actuator arranged to apply a reaction force to the roller, the control arrangement comprising hydraulics for applying fluid at an adjustable reaction pressure to the roller actuator to control the reaction force and for applying fluid to the traction loading actuator at a traction pressure which is related to the reaction pressure, thereby maintaining a relationship between reaction force and traction load, characterised in that the control arrangement further comprises at least one working chamber which is selectively connectable to and disconnectable from the reaction pressure or the traction pressure, and in that traction force is dependent upon pressure in the working chamber, so that by connecting/disconnecting the working chamber to/from the relevant pressure, the relationship between reaction force and traction force is changed.

2. A hydraulic control arrangement as claimed in claim 1 wherein reaction pressure is constantly supplied to at least one working chamber in the hydraulics by which traction force is controlled.

3. A hydraulic arrangement as claimed in claim 1 or claim 2 comprising at

least two working chambers each of which is selectively connectable to and disconnectable from the reaction pressure or the traction pressure, so that by selecting different permutations of the chambers multiple different relationships between reaction force and traction force are obtainable.

4. A hydraulic arrangement as claimed in any preceding claim further comprising a traction pressure control valve comprising the aforementioned working chamber.
5. A hydraulic arrangement as claimed in any of claims 1 to 3 further comprising a traction pressure control valve whose output forms the traction pressure and is controlled in response to opposed pilot pressure signals formed by (i) the reaction pressure and (ii) the traction pressure.
6. A hydraulic arrangement as claimed in claim 5 wherein the aforementioned chamber is a chamber of the traction pressure control valve, pressure in the chamber serving as a pilot pressure influencing the valve's output.
7. A hydraulic arrangement as claimed in claim 5 or claim 6 wherein the traction pressure control valve has at least three working chambers, pressures in each of which serve as pilot signals influencing the valve's output:
  - a first working chamber constantly connected to reaction pressure
  - a second working chamber constantly connection to the traction pressure, pressures in the first and second chambers working in opposition, and
  - a third working chamber which is selectively connectable to and disconnectable from the reaction pressure or the traction pressure.
8. A hydraulic arrangement as claimed in claim 7, further comprising a fourth

working chamber which is selectively connectable to and disconnectable from the reaction pressure or the traction pressure.

9. A hydraulic arrangement as claimed in claim 1 or claim 2 wherein the aforementioned working chamber is formed within the traction loading actuator, pressure in the working chamber contributing to the traction load.

10. A hydraulic arrangement as claimed in claim 9 wherein the traction loading actuator comprises at least two working chambers, one of which is constantly connected to the traction pressure and the other of which is selectively connectable to and disconnectable from the traction pressure.

11. A hydraulic arrangement as claimed in claim 10 comprising a further selectively connectable working chamber.

12. A hydraulic arrangement as claimed in any of claims 1, 2, 3, 9 or 10 wherein the reaction pressure and the traction pressure are the same.